



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/579,211	05/12/2006	Toshihiko Shirasagi	SON-3162	6592
23353 7590 11/04/2009 RADER FISHMAN & GRAUER PLLC LION BUILDING 1233 20TH STREET N.W., SUITE 501 WASHINGTON, DC 20036			EXAMINER VERDERAME, ANNA L.	
			ART UNIT	PAPER NUMBER
			1795	
			MAIL DATE	DELIVERY MODE
			11/04/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/579,211

Applicant(s)

SHIRASAGI ET AL.

Examiner

ANNA L. VERDERAME

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2009 and 18 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 4-7 and 10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4-7 and 10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

The applicant's responses filed on 03/31/2009 and 06/18/2009 have been carefully considered. A response is presented below.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 4-7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kouchiyama et al. JP-2003-315988 in view of Saito et al. US 4,786,538, Yamada et al. 4,916,048, and Lee et al. JP-2001-344826(English translation provided) .

Kouchiyama et al. '988 teaches a method of micro-fabrication wherein a resist layer including an incomplete oxide of W or Mo is patterned to prescribed shapes by selectively exposing and developing the layer. The incomplete oxide of a transition metal refers to a compound deviated to a direction where the oxygen content is lower than that of a stoichiometric composition (abstract). The resist of the incomplete inorganic oxide is formed by sputtering a target of a transition metal in an atmosphere containing argon and oxygen. The degree of oxidation of the incomplete oxide is controlled by changing the oxygen content in the atmosphere. Varying the oxygen

content, the addition of a second transition metal, and the provision of an interlayer are disclosed as methods for increasing the sensitivity of the resist (0059-0063).

Kouchiyama et al. '988 does not teach varying the oxygen concentration so that the concentration near the surface of the substrate is lower than the concentration at the surface of the resist. Further, the reference does not teach the formation of concavo/convex structures of different depths.

Saito et al. teaches varying the oxygen content in the thickness direction of a photosensitive TeO_x film. Thereby the medium obtained may be extremely stable and has excellent adhesive properties between the substrate (abstract). A tellurium or tellurium sub-oxide layer and/or a tellurium dioxide layer are laminated or a tellurium dioxide layer and/or a tellurium or tellurium sub-oxide layer are laminated (2/28-41). See description of figure 1 and figure 2(2/60-65).

In example 4 a film is formed wherein a film of $\text{TeO}_{0.1}$ is formed near the surface of the substrate and the oxygen content is increased toward the surface of the photosensitive layer. The surface of the photosensitive layer has a composition of TeO_2 (8/5-31).

Yamada et al. teaches photosensitive sub-oxide materials including WO_x , MoO_x , and TeO_x (abstract).

The teachings of Yamada et al. are used to show that the teaching to vary the oxygen content in a TeO_x film will likely produce the same results in WO_x and MoO_x films. Yamada et al. teaches that these films are interchangeable.

Lee et al. teaches a disc manufacturing method in which grooves and pits having different depths are formed by changing the power of the laser beam (abstract). See figures 2A-B.

It would have been obvious to modify the manufacturing method of Kouchiyama et al. '988 by varying the oxygen content in the inorganic photosensitive layer so that the concentration of oxygen at the surface of the resist layer is higher than that at the surface of the substrate or in which the oxygen content is higher at the surface of the substrate and lower at the surface of the resist based on the example of Saito et al. and based on the teaching of equivalence between TeO_x and MoO_x or WO_x by Yamada et al. and with the reasonable expectation of forming an extremely stable master having excellent adhesive properties between the substrate. Further, it would have been obvious to one of ordinary skill in the art to form concavo/convex structures having different depths by changing the laser power based on the disclosure of Lee et al.

Response to Arguments

Certified Translation:

Due to applicant's submission of the certified translation for Japanese Patent application No. 2003-401836 the prior art reference of record, Kouchiyama '39, has been overcome.

New Grounds of Rejection:

Applicant claims that the rejection at paragraph 2 of the non-final office action mailed on September 3, 2008 has failed to include a rejection of either original claim 3

or 7. This is correct and the examiner stated that this rejection was withdrawn in the final office action due to applicant's inclusion of the limitations of claims 3 and 7 into the independent claims.

The rejection of claims 1-10 over Kouchiyama et al. JP-2003-315988 or Kouchiyama et al. WO 2004/034391(US 2005/0226999 used as an English language translation) in view of Saito et al. US 4,786,538 Yamada et al. 4,916,048, and Lee et al. JP-2001-344826(English translation provided) was present in the non-final office action of September 3, 2008. Due to applicant's cancellation of claims 2-3 and 8-9, the rejection became a rejection of the remaining claims 1, 4-7 and 10.

As a further note the examiner points out that the rejection of claims 1-10 in the non-final office action and the rejection of claims 1, 4-7 and 10 in the final office action rejects these claims over independent references Kouchiyama '391 or in the alternative Kouhiyama '988 in view of dependent references Yamada, Saito, and Lee. The fact that the independent references are cited in the alternative is shown by the use of the word "or" in the statement of rejection and based on the recitation that it would be obvious to modify both of these methods in the same way as indicated in the "statement of obviousness".

Official Notice:

The applicant seems to assert that the examiner has taken official notice without document or affidavit support. In fact examiner has stated on page 6 of the final office action that "one of ordinary skill in the art would appreciate that the notation TeO_x refers

to an incomplete oxide where x varies and would further recognize that the notation TeO_2 refers to a complete or stoichiometric oxide". The examiner then points to section 5/12-38 of Yamada et al. for support of this assertion. In this section of Yamada the reference teaches an oxide MO_x where MO_x can be TeO_x where $0 < x < 2$, MoO_x where $0 < x < 3$, or WO_x where $0 < x < 3$. It is specified that x be less than 2, 3, and 3 respectively because TeO_2 , WO_3 and MoO_3 are complete or stoichiometric oxides and MO_x represents an oxide that is not a stoichiometric oxide.

The definition of a stoichiometric vs. a non-stoichiometric/incomplete oxide is also made clear by the abstract of Kochiyama et al. '988. The abstract states:

A resist layer including the incomplete oxide of transition metal like W or Mo is patterned to prescribed shapes by selectively exposing and developing the layer. The incomplete oxide of the transition metal described above refers to a compound deviated to a direction where the oxygen content is lower than that of the stoichiometric composition meeting the valence that the transition metal can take, i.e., the compound having the oxygen content in the incomplete oxide of the transition metal lower than the oxygen content of the stoichiometric composition meeting the valence that the transition metal can take.

Further, in Saito a TeO_x film where x varies from 0 to 2 is taught. See disclosure 1/41 and 2/44.

Based on the supporting disclosure of all of these references the examiner has stated that one of ordinary skill in the art would recognize that the notation TeO_x refers

to a non-stoichiometric/incomplete oxide where $x < 2$ because TeO_2 is a stoichiometric oxide. Similarly WO_x refers to an oxide where $x < 3$ and MoO_x refers to an oxide where $x < 3$.

Conclusion

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Namely the applicant's cancellation of claims 2-3 and 8-9 and the applicant's filing of a certified translation to overcome the Kouchiyama '391 reference. Because Kouchiyama '988 and '391 were listed as independent references in the alternative removal of Kouchiyama '391 does not constitute a new line of rejection because the rejection as presented rejected the claims in view of Kouchiyama '391 in view of Saito, Yamada, and Lee or alternatively in view of Kouchiyama '988 in view of Saito, Yamada, and Lee. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANNA L. VERDERAME whose telephone number is (571)272-6420. The examiner can normally be reached on M-F 8A-4:30P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached at (571)-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Anna L Verderame/
Examiner, Art Unit 1795

/Cynthia H Kelly/

Supervisory Patent Examiner, Art Unit 1795